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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/652,327
Filing Date: August 29, 2003
Appellant(s): ELZUR, URI et al.

Frankie Wong, Reg. No. 61,832
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 02/19/2010 appealing from the Office action mailed 08/13/2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6266680	Boucher et al.	05-2001
Kistler et al.	US publication 2002/0198934.	12-2002
Hayes et al.	US publication 2003/0046330	03-2003
Yang et al.	US publication 2002/0041566	04-2002
Microsoft	Winsock Direct and Protocol Offload on SANs	03-2001
Callaghan	NFS over RDMA	01-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 29-31 are rejected under 35 U.S.C. 101 the claimed invention is directed to non-statutory subject matter. A driver *executable on a computer system* is non-statutory subject matter, since a driver *executable on a computer system* is just computer program codes and does not comprise the computer system or any hardware elements in that computer system.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-4, 15-20, and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Boucher et al. (US 6,226,680, hereafter Boucher).

5. For claim 1, Boucher discloses a server, comprising:

- a network connector (fig. 13, col. 16 lines 6-12, network line 210, four network lines are presented for different conduits, but each of them is a media independent interface);

- a processor coupled to the network connector (fig. 13, microprocessor 470, col. 16 line 62-col. 17 line 13), the processor being operable to process a plurality of different types of network traffic, wherein each of said plurality of different types of network traffic corresponds to a different network protocol (abstract, col. 3 lines 35-67, col. 6 lines 33-55, col. 13 lines 24-35, the intelligent network interface card INIC's processor supports an fast path candidate traffics and slow path traffics by identifying input packet protocol types);
- a peripheral component interface (PCI) bridge coupled to the processor (fig. 13, PCI bus interface unit); and
- a unified driver coupled to the PCI bridge, the unified driver being operable to provide drivers associated with the plurality of different types of network traffic (fig. 6 and 10, PCI bridge 157 connected to protocol stack with driver, col. 14 l. 9-13, INIC miniport driver determines whether the traffic is fast path candidate offload traffic or non-fast path IP and/or Ethernet traffic).

6. For claim 2, Boucher further discloses the network connector comprises an Ethernet connector (fig. 13, network line 210 is an Ethernet connector).

7. For claim 3, Boucher further discloses the plurality of different types of network traffic comprises two or more of common Ethernet traffic, offload traffic, storage traffic, interprocess communication (IPC) traffic, management traffic and remote direct memory access (RDMA) traffic (abstract, col. 3 lines 35-67, col. 13 lines 24-35, the intelligent network interface card INIC's processor supports an offload traffic protocols via fast path and regular IP traffic protocols via a slow path, or Ethernet traffic and offload traffic).

8. For claim 4, Boucher further discloses the processor comprises a single integrated chip (fig. 9, fig. 13, microprocessor).

9. For claim 15, Boucher further discloses the processor or the PCI bridge determines which of the different types of network traffic accesses a particular service provided by the server (fig. 10 and 11, col. 14 l. 9-13 and 61-66, INIC miniport driver determines whether the traffic is fast path offload traffic protocol and slow path traffic protocol).

10. For claim 16, the claim is rejected for the same rationale as in claim 13.

11. For claim 17, Boucher further discloses the processor, the PCI bridge or the unified driver provides a unified data and control path (fig. 10 and 11, col. 14 l. 9-13 and 61-66, INIC miniport driver determines whether the traffic is fast path offload traffic protocol and slow path IP traffic protocol).

12. For claim 18, Boucher discloses a method for network interfacing, comprising:

handling a plurality of different types of network traffic via a layer 2 (L2) connector (fig. 13, col. 16 lines 6-12, a network line 210 connected to a MAC controller supporting both offload protocol traffic and slow traffic protocol);

wherein each of said plurality of different types of network traffic corresponds to a different network protocol (abstract, col. 3 lines 35-67, col. 6 lines 33-55, col. 13 lines 24-35, the intelligent network interface card INIC's processor supports an fast path candidate traffics and slow path traffics by identifying input packet protocol types)

processing the different types of network traffic in a single chip (fig. 13, microprocessor 470, col. 16 line 62-col. 17 line 13, col. 3 lines 35-67, the INIC supports an offload traffic via fast path and regular IP traffic via a slow path); and

determining which of the different types of network traffic accesses software services via a single data path (fig. 10 and 11, col. 14 l. 9-13 and 61-66, INIC miniport driver determines whether the traffic is fast path candidate offload traffic or non-fast path IP or Ethernet traffic, single line connecting INIC and INIC miniport driver, fig. 13, a single PCI bus interface 257).

13. For claim 19, Boucher further discloses the plurality of different types of network traffic comprises two or more of common Ethernet traffic, offload traffic, storage traffic, interprocess communication (IPC) traffic and management traffic (abstract, col. 3 lines 35-67, col. 13 lines 24-35, the intelligent network interface card INIC's processor supports an offload traffic via fast path and regular IP traffic via a slow path, or Ethernet traffic and offload traffic) and/or remote direct memory access (RDMA) traffic.

14. For claim 20, Boucher further discloses the L2 connector is a single L2 connector (fig. 13, col. 16 lines 6-12, a network line 210 connected to a MAC controller, four network lines are presented for different conduits, but each of them is media independent interface).

15. For claim 23, Boucher further discloses: providing drivers associated with the plurality of different types of network traffic via a unified driver (fig. 11 INIC miniport driver for both offload traffic and regular IP traffic).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boucher, as applied to claim 1 above, and further in view of Kistler et al. (US 2002/0198934, hereafter Kistler)

18. For claims 10 and 11, Boucher discloses the invention as in claim 1. Boucher does not disclose a server management agent coupled to the processor that is coupled to a keyboard and/or video and/or mouse service.

However, Kistler discloses the same (fig. 3 keyboard and mouse connected to an emulator that is coupled to a NIC)

Therefore, it would have been obvious for one skilled in the art at the time of the invention to combine the teachings of Boucher and Kistler to provide console interaction handling over the network (Kistler, abstract)

19. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boucher as applied to claim 1 above, and further in view of Microsoft (Winsock Direct and Protocol Offload on SANs, 03/03/2001).

20. For claim 14, Boucher does not disclose the unified driver is coupled to a software TCP processor and to a socket service switch, wherein the software TCP processor is coupled to the socket service switch

However, Microsoft discloses the unified driver is coupled to a software TCP processor and to a socket service switch, wherein the software TCP processor is coupled to the socket service switch (Microsoft, fig. 1, a socket switch between a TCP/IP socket provider and a SAN provider), and wherein the socket service switch is coupled to a socket service (Microsoft, fig. 1, switch coupled to socket application).

Therefore, it would have been obvious for one skilled in the art at the time of the invention to combine the teachings of Boucher and Microsoft to provide WinSock socket service switch to a TCP/IP-offload-enabled NIC card of Boucher in order to further enhance the card with more functionalities such as RDMA traffic support.

21. For claim 12, Boucher-Microsoft discloses the invention as in claim 14. Boucher-Microsoft further discloses a plurality of services coupled to the unified driver (Microsoft, fig. 1, p. 5 lines 7-8, socket service, RDMA service).

22. For claim 13, Boucher-Microsoft discloses the invention as in claim 14. Boucher-Microsoft further discloses the particular service comprises at least one of a socket service, a SCSI miniport service, an RDMA service and/or a keyboard and/or video and/or mouse service (Microsoft, fig. 1, p. 5 lines 7-8, socket service, RDMA service).

23. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boucher, as applied to claim 18 above, and further in view of Official Notice (hereafter ON).

24. For claim 21, the claim is rejected as in claim 18. Boucher does not disclose employing time division multiplexing to determine which of the different types of network traffic access the software services via the single data path.

However, Official Notice is taken that it is well known in the art how to employ time division multiplexing (TDM) to transmit multiple traffics over one channel in different timeslots. Microsoft Computer Dictionary (fifth edition) defines time division multiplexing as a form of multiplexing in which transmission time is broken into segments, each of which carries one segment of one signal or traffic type.

Therefore, it would have been obvious for one skilled in the art at the time of the invention to combine the teachings of Boucher and what is well known in the art to determine which of the different types of network traffic access the software services via the single data path by allotting multiple traffic segments of different types over one channel in different time slots using TDM in order to minimize cost and complexity of building multiple channels unnecessarily.

25. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boucher, further in view of Yang et al. (US 2002/0041566, hereafter Yang).

26. For claim 22, the claim is rejected for the same rationale as in claim 18. Boucher does not disclose dynamically allocating fixed resources among the different types of network traffic.

However, Yang discloses dynamic and fixed resource allocation for time division multiplexing (abstract)

It would have been obvious for one skilled in the art at the time of the invention to combine the teachings of Boucher and Yang to allocate fixed resources among traffic types to allow optimize the use of resource such as service rate while maintaining quality of services (Yang, [0018])

27. Claims 5-8 and 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boucher, as applied to claim 1 above, and further in view of Hayes et al. (US 2003/0046330, hereafter Hayes)

28. For claim 5, Boucher further discloses the processor comprises a layer 2 network interface card (L2 NIC) (fig. 13, MAC controller 402), a transmission control protocol (TCP) processor (fig. 9, TCP processor for offload).

Boucher does not disclose an upper layer protocol (ULP) processor;

However, Hayes discloses an upper layer protocol (ULP) processor (fig. 3, [0017], NIC with an auxiliary processor for offloading iSCSI upper layer traffic)

Therefore, it would have been obvious for one skilled in the art at the time of the invention to combine the teachings of Boucher and Hayes to provide ULP support for a TCP/IP offload NIC card in order to further enhance the card with more functionalities such as iSCSI traffic support over TCP/IP.

29. For claim 6, Boucher-Hayes discloses the invention as in claim 5. Boucher-Hayes further discloses the TCP processor provides layer 3 processing and layer 4 processing (fig. 9, an offload processor provides L3 IP and L4 TCP offload traffic).

30. For claim 7, Boucher-Hayes discloses the invention as in claim 5. Boucher-Hayes further discloses the TCP processor is shared by two or more of TCP offload traffic (fig. 9, an offload processor provides L3 IP and L4 TCP offload traffic), Internet small computer system interface (iSCSI) traffic (Hayes, [0017]) and RDMA traffic.

31. For claim 8, Boucher-Hayes discloses the invention as in claim 5. Boucher-Hayes further discloses the ULP processor provides iSCSI processing (Hayes, [0017], [0018]).

32. For claim 24, Boucher discloses a method for network interfacing, comprising:

handling a plurality of different types of network traffic via a single Ethernet connector (fig. 13, col. 16 lines 6-12, a network line 210 connected to a MAC controller supporting both offload traffic and regular IP traffic);

wherein each of said plurality of different types of network traffic corresponds to a different network protocol (abstract, col. 3 lines 35-67, col. 6 lines 33-55, col. 13 lines 24-35, the intelligent network interface card INIC's processor supports an fast path candidate traffics and slow path traffics by identifying input packet protocol types)

processing the plurality of different types of network traffic using a layer 2 (L2) processor (fig. 13, L2 MAC controller 402), a layer 3 (L3) processor and a layer 4 (L4) processor (fig. 9 a TCP/IP offload processor that processes L3 and L4 traffics) and

providing a unified data and control path (fig. 13 links between processor and PCI bus interface).

Boucher does not disclose an upper layer protocol (ULP) processor;

However, Hayes discloses an upper layer protocol (ULP) processor (fig. 3, [0017], NIC with an auxiliary processor for offloading iSCSI traffic);

Therefore, it would have been obvious for one skilled in the art at the time of the invention to combine the teachings of Boucher and Hayes to provide ULP support for a TCP/IP offload enabled NIC card in order to further enhance the card with more functionalities such as iSCSI traffic support over TCP/IP.

33. For claim 25, the claim is rejected for the same rationale as in claim 20.

34. For claim 26, Boucher-Hayes discloses the invention as in claim 5. Boucher-Hayes further discloses the L3 processor and the L4 processor are combined into a single TCP processor (fig. 9, TCP offload processor 230 bypasses (L3 IP and L4 TCP) offload traffic to upper layers (application layer…)

35. For claim 27, the claim is rejected for the same rationale as in claim 24.

36. For claim 28, the claim is rejected for the same rationale as in claim 23.

37. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boucher-Hayes, as applied to claim 5 above, and further in view of Microsoft.

38. For claim 9, Boucher-Hayes discloses the invention as in claim 5. Boucher-Hayes does not disclose the ULP processor provides RDMA processing

However, Microsoft discloses the same (Microsoft, page 5, Remote DMA semantics including RDMA write and read).

Therefore, it would have been obvious for one skilled in the art at the time of the invention to combine the teachings of Boucher-Hayes and Microsoft to provide WinSock socket service switch between RDMA and TCP/IP in order to further enhance the card with more functionalities such as RDMA traffic support.

39. Claims 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boucher, further in view of Callaghan (NFS over RDMA).

40. For claim 29, Boucher discloses a unified driver comprising:

a computer program executable on a computer system, having at least one code section for arranging and processing network traffic, wherein the at least one code section causes the computer system to perform steps comprising:

executing said at least one code section from said unified driver in said computer system to handle a plurality of different types of network traffics (fig. 6 and 10 and 13, single network interface card INIC connected to host through a PCI bridge 157, col. 14 l. 9-13, codes from INIC miniport driver on the INIC determines whether the traffic is fast path offload traffic (TCP/IP for instance) and non-fast path traffic (IP, Ethernet traffic) and network services via a single PCI bridge (fig. 13, single PCI bridge 257),

wherein each of said plurality of different types of network traffic corresponds to a different network protocol (abstract, col. 3 lines 35-67, col. 6 lines 33-55, col. 13 lines 24-35, the intelligent network interface card INIC's processor supports an fast path candidate traffics and slow path traffics by identifying input packet protocol types)

the network services comprise a storage service (col. 13 lines 42-45, large file transfer service using fast path or SMB over TCP/IP). Boucher also discloses a DMA controller for direct memory access to the host system cache (col. 13 lines 53-58).

Boucher does not explicitly disclose a socket service, RDMA service or keyboard/video/mouse service.

However, Callaghan discloses a storage service and a RDMA service (section 2 and 6, network file system service (NFS) and RDMA service using hardware, section 7)

It would have been obvious for one skilled in the art at the time of the invention to combine the teachings of Boucher and Callaghan to implement NFS over RDMA to make full and efficient use of gigabit network (Callaghan, first par.)

41. For claim 30, Boucher-Callaghan further discloses coupling said single PCI bridge to an integrated chip to concurrently process a plurality of network traffics (Boucher, fig. 10, 11, 13, INIC card coupled to PCI bridge).

42. For claim 31, Boucher-Callaghan further discloses said plurality of network traffics comprise two or more of offload traffic (Boucher, col. 6 lines 39-55, TCP/IP processed by the processor on the network interface card (INIC) is offload traffic), storage traffic (Boucher, col. 13 lines 42-45, large file transfer service using fast path or SMB over TCP/IP), interprocess communication (IPC) traffic, management traffic and/or remote direct memory access (RDMA) traffic.

(10) Response to Argument

<U.S.C 101 rejection>

Claims 29-31 are rejected under 35 U.S.C. 101 the claimed invention is directed to non-statutory subject matter. A driver *executable on a computer system* is non-statutory subject matter, since a driver *executable on a computer system* is just computer program codes and does not comprise the computer system or any hardware elements in that computer system. Applicant argues in the brief that the unified driver executes the program codes in the computer system; therefore, the unified driver is tied to a computer system, and is statutory. The examiner respectfully disagrees. The claimed subject matter is the unified driver, which is executable by a computer and does not include the computer itself, and is software per se, or non-statutory subject matter.

<U.S.C 102(e) rejection>

For independent claims 1 and 18, appellant has argued that prior art Boucher does not teach "the processor operable to process a plurality of different types of network traffic, wherein each of said plurality of different types of network traffic corresponds to a different network protocol."

It is respectfully submitted that Boucher does teach the limitation. Based on the claimed language, any processor that can process two different traffics that each is a different protocol can read on the claims. Boucher clearly teaches a processor coupled to the network connector (fig. 13, microprocessor 470, col. 16 line 62-col. 17 line 13), the processor being operable to process a plurality of

different types of network traffic, wherein each of said plurality of different types of network traffic corresponds to a different network protocol (abstract, col. 3 lines 35-67, col. 6 lines 33-55, col. 13 lines 24-35, the intelligent network interface card INIC's processor supports an fast path candidate traffics by identifying protocols such as TCP/IP or SPX/IPX and slow path traffics by identifying input packet protocol types, col. 14 lines 37-40, TCP, TTCP, SPX are fast path protocol traffic, col. 14, lines 51-53, traffic with non-accelerated protocols are processed conventionally using the slow path processing)

For claims 3 and 19, appellant has argued that prior art Boucher does not teach two or more of common Ethernet traffic, offload traffic, storage traffic, interprocess communication traffic (IPC) traffic, management traffic and RDMA traffic. It is respectfully submitted that Boucher does teach the limitation (col. 10 lines 32-37, Ethernet traffic, col. 8 lines 3-12, col. 13 lines 42-67, SMB over TCP/IP or storage traffic directly forwarded to storage destination bypassing session, transport, network and datalink layer processing, col. 7 lines 37-45, offload traffics such as TCP/IP, SPX/IPX).

<U.S.C 103(a) rejection>

For claims 10 and 11, appellant has argued that prior art Boucher and Kistler do not teach "server management functions". The examiner submits that the claims only recite "a server management agent" coupled to a keyboard or video or mouse service, without reciting any management functions. Therefore,

any keyboard or video or mouse service processing agent can be read as the claimed "server management agent," such as keyboard and mouse connected to an emulator that is coupled to a NIC (Kistler, fig. 3, [0026], emulator 324 has serial hardware interface, connecting to keyboard/video/mouse and NIC)

For claims 10 and 11, appellant has argued that prior art Boucher and Microsoft do not teach "the unified driver is coupled to a software TCP processor and a socket service switch." The examiner submits appellant's mapping of the claimed subject matter is incorrect. From fig. 1, Microsoft clearly teaches a unified driver (NDIS driver) coupled to a software TCP processor (TCP/IP socket provider) and a socket service switch (Switch connected to socket application) similar to fig. 2 of the application (driver 450, software TCP/IP processor 460, switch 470 and services 480)

For claim 21, appellant has argued that prior art Boucher and what was known in the art (using Official Notice or ON) do not teach "time division multiplexing (TDM) to determine which of the different types of network traffic access the software services via the single data path." The examiner respectfully disagrees. Boucher teaches assessing software services via a single data path (fig. 6, single data path 155 processes traffics using fast-path processing and slow-path processing or at least two different traffics as shown in claim 1, traffics accessing source/destination or software services via path 155). It was known in the art that TDM is a form of multiplexing in which transmission time is broken

into segments, each of which carries one segment of one signal (Microsoft Computer Dictionary (fifth edition)). Therefore, it would have been obvious for one skilled in the art at the time of the invention to combine the teachings of Boucher and what is well known in the art to determine which of the different types of network traffic access the software services via the single data path as taught by Boucher by allotting multiple traffic segments of different types over one channel in different time slots using TDM as known in the art in order to minimize cost and complexity of building multiple channels or paths unnecessarily.

For claim 22, appellant has argued that prior art Boucher and Yang do not teach "dynamically allocating fixed resources between among the different types of network traffic" because Yang's dynamic scheduling of data packets pertain to the physical L2 level only. This argument is vague as to what L2 level has to do with the claimed subject matter and there is no support for layer 2 in the argument. The rejection is maintained.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/HH/

Hieu Hoang

Patent Examiner

Art Unit 2452

Dated: May 25, 2010

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